REMARKS

The drawing informalities have been addressed by the submission of REPLACEMENT SHEETS for each of Figures 2-3, 9-11 and 15. The attached ANNOTATED SHEETS SHOWING CHANGES illustrate the specific changes. All issues raised in paragraphs 2-4 of the Office Action have been addressed. The undersigned apologies for the inadvertent errors in the original drawings, and the Examiner is thanked for pointing them out. The drawings should now be in compliance with all formal requirements.

The objection to the specification is paragraph 5 of the Office Action has been addressed by correcting the typographical error in paragraph [79] of the written description. (This paragraph was identified in the Office Action as "paragraph 0071" but the error in question was only found in the former paragraph). The written description should now be in compliance with all requirements under 35 U.S.C. §112.

The claim objection in paragraph 6 has been rectified by changing the phrase "the known pattern" to "the pattern." While there were no other formal patent claim objections, during the process of preparing for the Interview new counsel of record made a thorough review of the pending claim language and identified several other wording issues in the claims. Accordingly, several additional revisions have been made to the claim language either to correct defects in the original wording, to improve readability, or both. In particular, the following amendments have been made to correct various phrases that lacked appropriate antecedents: in claims 4-6, the word "remote" has been included for the phrase "remote object," in claim 9, the phrase "laser beam" has been rewritten to "beam of light," and in claim 11, the phrase "laser light source" has been changed to "light source." Dependent claims 10-12 have been reworded to improve readability and to rewrite the "voice recognition means for controlling" limitation. Finally, claim 4 has been amended because of the inclusion of the "pattern" limitation in parent claim 1. The claims are now deemed to fully comply with 35 U.S.C. §112.

Claims 1-3, 7, 9, 11 and 13-14 were rejected under 35 U.S.C. §102(b) as being anticipated by Wenz, U.S. Patent No. 5,440,393. For the reasons set during the Interview, this rejection is traversed. MPEP § 2131 provides that a "claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. ... 'The identical invention must be shown in as complete detail as contained in the

... claim.' The elements must be arranged as requred by the claim." (citations omitted, emphasis supplied).

Wenz does not meet this stringent requirement. The patent describes an interferometer system, not a beam deflection system. The subject application (in paragraph [05]) identifies the interferometer approach (such as described and illustrated in Wenz) as the prior art. It was demonstrated during the Interview that Wenz has no collimating optics, and no scanner to scan a collimated beam pattern along at least two axes. Indeed, the word "collimating" is not used in Wenz. The collimating optics are useful in the laser digitizer of the subject application to ensure that a tightly-focused spot can be transmitted over what is a relatively long optical path; Wenz, in contrast, needs to create a wide beam just to generate the required interference pattern within the device itself. Moreover, Wenz teaches away from using collimation, indicating at Column 9, line 55+ that the beam generated by his device has the characteristic that the "whole of the buccal cavity can be illuminated simultaneously (emphasis supplied)." As the Examiner indicated in the Interview Summary, there is "light source having collimating optics" configured to generate a collimated beam of light in Wenz. For this reason alone, Wenz did not anticipate any of claims 1-3, 7, 9, 11 or 13-14 as originally filed.

As to the scanner limitation, an interferometer does not scan a beam of light; Wenz uses mirrors 12 and 14 to cause two beams of light to interfere with each other to create a single interference pattern. Wenz then uses a sinusoidal mirror to cause incident light to be reflected along different paths. As also demonstrated to the Examiner during the Interview, the Wenz interferometer approach is not dynamic scanning of a single collimated beam along at least two axes. Indeed, Wenz states explicitly that his "strip pattern ... is generated by means of interference (Column 11, lines 20-21)," which is not scanning, as the original claim language recited. For this additional reason, Wenz did not anticipate any of claims 1-3, 7, 9, 11 or 13-14 as originally filed.

As to the optics relay limitation, during the Interview it was pointed out that a conventional definition (from the Photonics Dictionary) of an "optics relay" is a "lens or lens system used to transfer a real image from one point within an optical system to another, with or without magnifying it." In Wenz, the beam exiting the polarizer 9 (see Figure 1) is diverging and the sinusoidal mirror 20 is designed to intentionally distort the beam. As was demonstrated to the Examiner, there is no structure that merely transfers an image within the Wenz

interferometer; in contrast, the sinusoidal mirror 20 actively distorts the interference pattern. Because there is no optics relay in Wenz, claims 1-3, 7, 9, 11 and 13-14 as originally filed could not have been anticipated by this reference.

Claims 4-6, 10, 12, 15 and 17-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wenz, in view of Ernst, U.S. Patent No. 6,402, 707. For the reasons discussed during the Interview, this rejection is also respectfully traversed.

While Ernst relates generally to intra-oral imaging, the patent deals specifically with the problem of processing multiple scans or views that have been generated by some device. The patent, however, assumes a number of three dimensional data sets (from the individual scans) exist, but it does not prescribe any particular structure or process for generating a particular data set, which is the subject of this invention. The Examiner relied upon the reference to the extent it taught the use of a "global coordinate space" associated with the oral cavity; this space, according to the patent, could be mapped by "any global coordinate system" including a "curvilinear coordinate system (emphasis supplied)." As discussed during the Interview, however, the reference to "curvilinear" in the patent was used only in the context of a "curvilinear coordinate system." There was no disclosure or suggestion to generate a particular data set, e.g., by directing a pattern of a plurality of curves onto an object, or how to do so. Because this subject matter was not present in Ernst, any permissible combination of Wenz and Ernst could not have been the subject matter, taken as a whole, of any of claims 4-6, 10, 12 , 15 or 17-20, even as originally filed.

Claim 16 was rejected under 35 U.S.C. §103(a) as being unpatentable over Wenz, in view of Ernst, further in view of Wu et al., U.S. Patent No. 5,338,198. Although claim 16 has now been cancelled, this rejection is also traversed, for the reasons discussed during the Interview. In particular, Wu et al. merely taught the known technique of using a rod lens to transfer an image from inside the body out; Wu et al. did not teach using an optics relay to transfer a pattern generated outside the oral cavity into the cavity.

Although each art rejection has been traversed, during the Interview preparation it was determined that some of the claims could be amended to clarify the nature of the present invention. As can be seen from the arguments set forth above, these amendments have not been

made to address prior art rejections.[1] Thus, as discussed during the Interview, claim 1 has been amended to clarify that, in effect, the scanner is generating "a pattern" that is relayed by the optics relay, and that it is a reflection of the pattern that is processed to generate an image of the object. This operation was demonstrated to the Examiners during the Interview. In particular, although the "light source having collimating optics" generates "a collimated beam of light," as the scanner scans this beam over a time interval (e.g., the reciprocal of the frame rate, or the shutter speed), an image sensor in the image optics system, in effect, "sees" a pattern (e.g., a set of segments). Thus, the phrase "to generate a pattern" has been added in amended claim 1 to help clarify this point.

Method claim 17 also has been amended to clarify that the multi-axis collimated beam of light is scanned over a given time interval to generate a "pattern" of "substantially parallel curves," which are then relayed, projected onto the object, received as a reflection, and then relayed to a (fourth) position, where the reflection is captured. The prior art does not describe or suggest these set of steps.

New independent claim 25 was the claim presented during the Interview. As the Examiner will recall, this claim describes an illustrated embodiment of the laser digitizer that includes the first optics relay, together with a second optics relay that is positioned co-linear to the first optics relay, such as illustrated in the plan view (Figure 3). The claim also recites the generation of the "pattern comprising a set of segments" and the relaying of that pattern. This structure and operation are not present in any of the cited references. New independent claim 30 recites the first optics relay and co-linear second optics relay structure, and describes the pattern generation, although in a different manner from that in claim 25. Each of these claims is now also deemed to describe patentable subject matter.

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[1] The Examiner will note that Claims 13-16 have been cancelled, as these claims included several "means plus function" clauses. In this regard, the Examiner noted at the conclusion the Interview that he had not formed a firm opinion regarding whether Wenz was still applicable to the MPF clauses, given the arguments that were made during the presentation. (It is noted that the claims having the MPF clauses were not specifically discussed at the Interview). Nevertheless, in reviewing these claims following the Interview, it was determined that they were superfluous given the other claims in the case; thus, to reduce the number of outstanding issues, these claims now have been cancelled. For the reasons advanced above, however, these claims were neither anticipated nor obvious in view of Wenz, taken either alone or in combination with any other art. In this regard, it should be noted that an MPF clause can only be met if both identical function and corresponding (or equivalent) structure can be shown in the cited reference. Wenz, for the reasons discussed, did not have any structure corresponding to at least the "means for generating a collimated beam of light" or the "scanner means" in independent claim 13 as originally filed.

The remaining claims are dependent, and each such claim is allowable for at least the reasons advanced with respect to its respective parent claim.

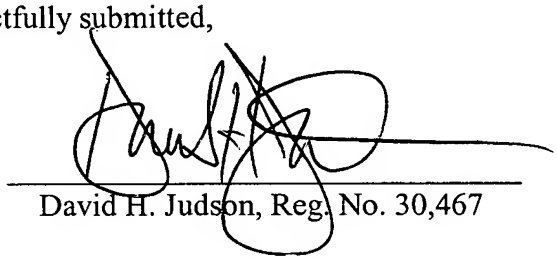
A Form PTO/SB/82 has been included to appoint the undersigned as counsel of record. Please note the Change of Correspondence address.

A payment of $225.00 is included herewith to cover the additional claim fees. In particular, as a result of the amendment, there are no 25 claims, 4 of which are independent.

Once again, the undersigned would like to thank Examiner Stock for his time during last week's Interview, and for his further consideration of the claims and the above remarks.

A Notice of Allowance is respectfully requested.

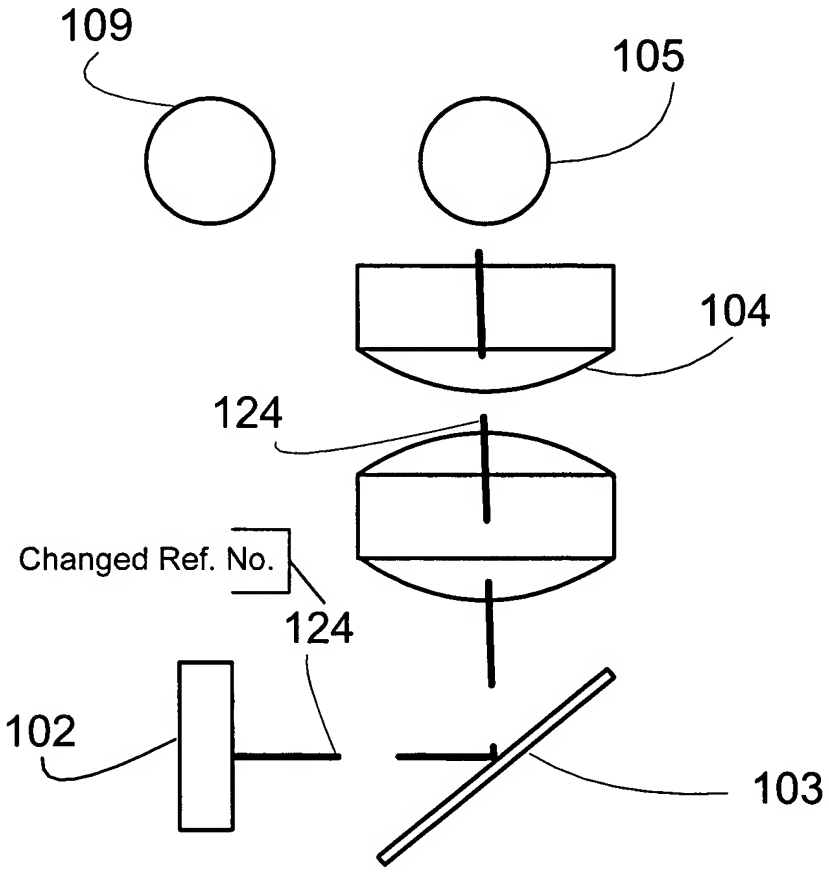
Respectfully submitted,



By: _____
David H. Judson, Reg. No. 30,467

REPLACEMENT DRAWINGS - FOR ENTRY

ORIGINAL DRAWINGS – ANNOTATED TO SHOW CHANGES



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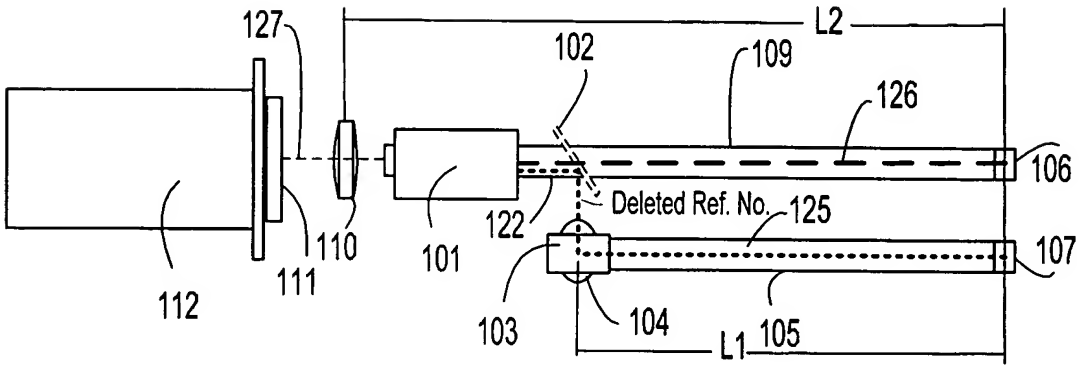
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Figure 3

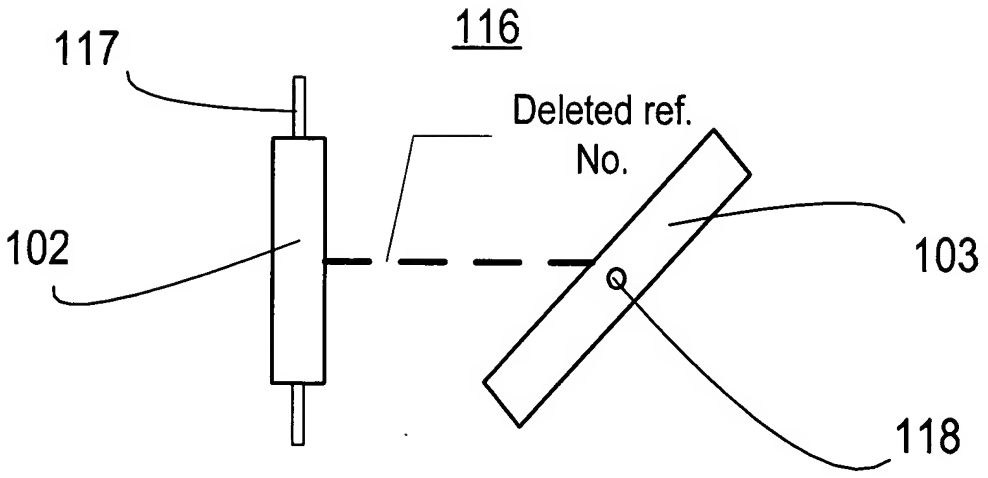

Figure 9

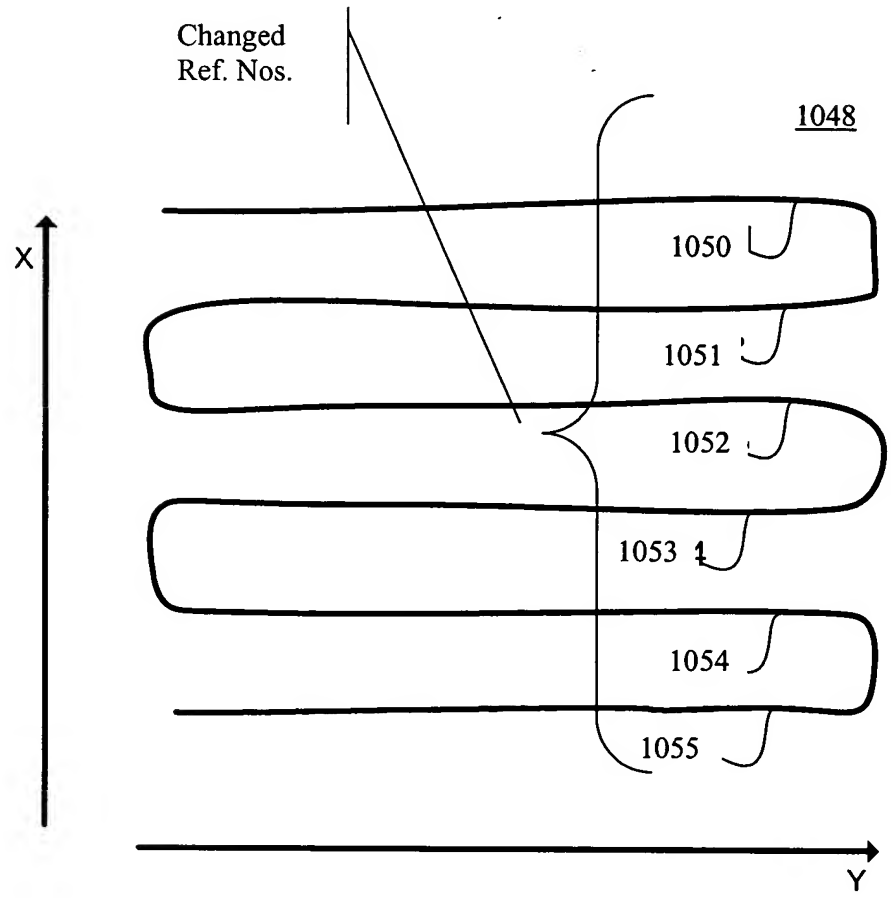

Figure 10

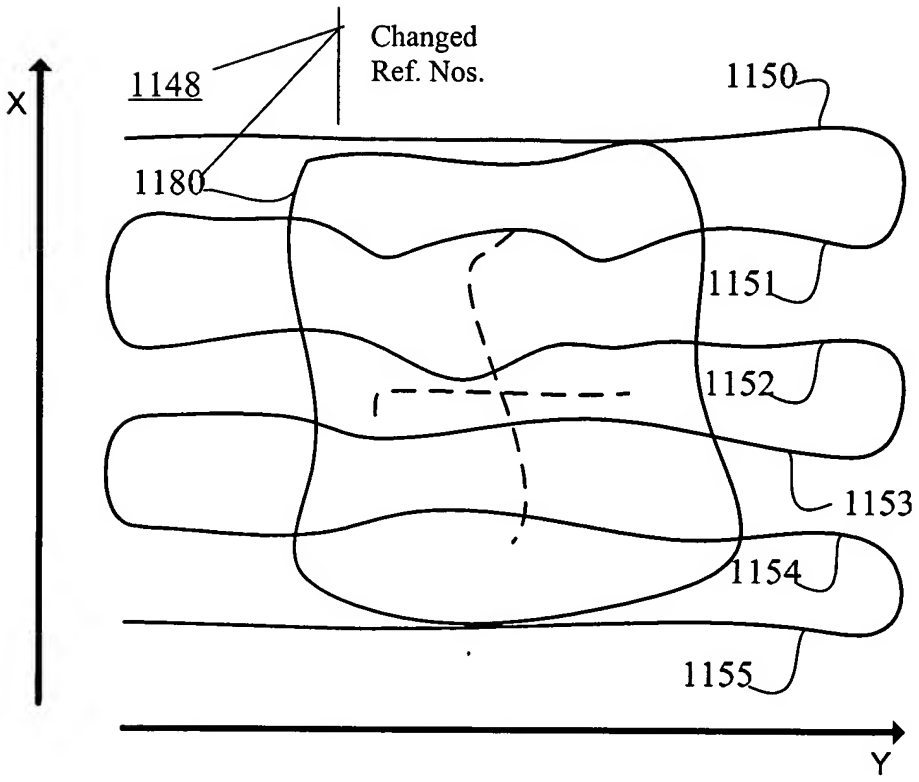

Figure 11

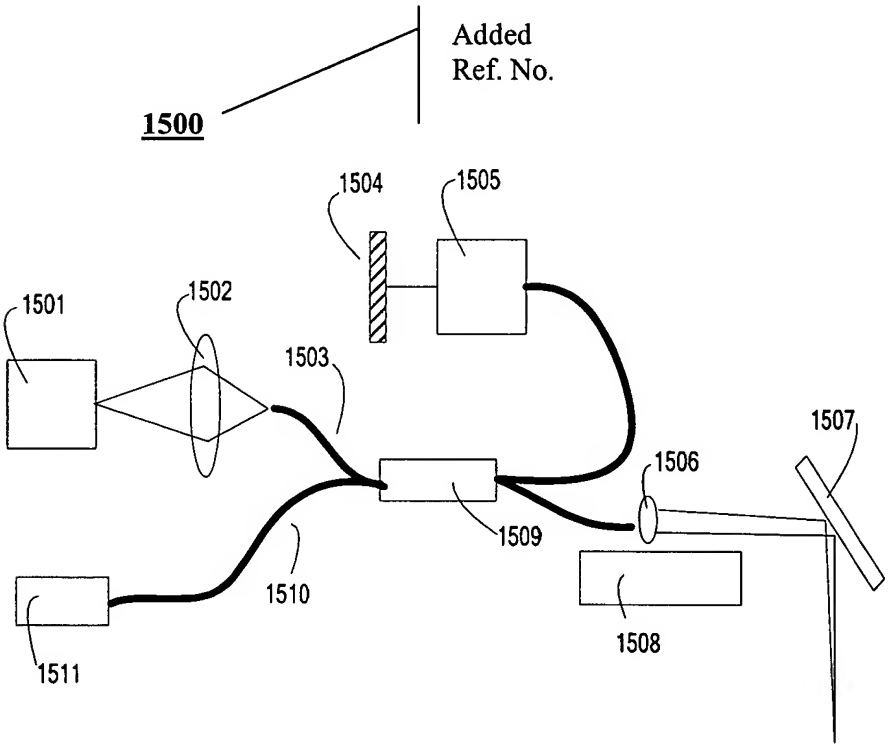
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Figure 15